

SOLVED LOGIC PROBLEMS, 2<sup>nd</sup> half of 6-1

Some of these problems are quite difficult. Trying them may be good practice, but mastery of them is not required to do well on Phil 521.

1		(Ex) (Ey) (Px > Qy) / (x) Px > (Ex) Qx	
2	a	(Ey) (Pa > Qy)	A
3	b	Pa > Qb	A
4		(x) Px	A
5		Pa > Qb	3, R
6		Pa	4, UE
7		Qb	5, 6, >E
8		(Ex) Qx	7, EI
9		(x) Px > (Ex) Qx	4-8, >I
10		(x) Px > (Ex) Qx	2, 3-9, EE
11		(x) Px > (Ex) Qx	1, 2-10, EE

SET E PROB M

1		(Ex) (y) (Px > Qy) / (x) Px > (x) Qx	
2	a	(y) (Pa > Qy)	A
3		Pa > Qb	2, UE
4		(x) Px	A
5		Pa	4, UE
6		Pa > Qb	3, R
7		Qb	6, 5, >E
8		(x) Qx	7, UI
9		(x) Px > (x) Qx	4-8, >I
10		(x) Px > (x) Qx	1, 2-9, EE

SET E PROB N

1		(x) (Ey) (Px > Qy) / (Ex) Px > (Ex) Qx	
2		(Ex) Px	A
3	a	Pa	A
4		(x) (Ey) (Px > Qy)	1, R
5		(Ey) (Pa > Qy)	4, UE
6	b	Pa > Qb	A
7		Pa	3, R
8		Qb	6, 7, >E
9		(Ex) Qx	8, EI
10		(Ex) Qx	5, 6-9, EE
11		(Ex) Qx	2, 3-10, EE
12		(Ex) Px > (Ex) Qx	2-11, >I

SET E PROB O

This is a hard problem, and the solution given here is long because it does not use any extended rules. Another, shorter solution is given below, using extended rules. Later solutions also use extended rules.

1		(x) Px > (x) Qx / (Ex) (y) (Px > Qy)	
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SET E PROB P

A shorter, simpler solution

1		(x) Px > (x) Qx / (Ex) (y) (Px > Qy)	
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10		(x) Px	9, UI
11		(x) Px > (x) Qx	1, R
12		(x) Qx	10, 11, >E
13		Qb	12, UE
14		Pa > Qb	13, W
15		(y) (Pa > Qy)	14, UI
16		(Ex) (y) (Px > Qy)	15, EI
17		(Ex) (y) (Px > Qy)	2, 16, (2-16), RD

SET E PROB P

1		(x) (y) (Px v Qy) / (x) Px v (y) Qy	
2		(y) (Pa v Qy)	1, UE
3		Pa v Qb	2, UE
4		~ ( (x) Px v (y) Qy)	A
5		~ (x) Px & ~ (y) Qy	4, DM
6		~ (x) Px	5, &E
7		~ (y) Qy	5, &E
8		(Ex) ~Px	6, ~U
9		(Ey) ~Qy	7, ~U
10		a   ~Pa	A
11		Pa v Qb	3, R
12		Qb	10, 11, vE
13		Qb	8, 10-12, EE
14		(y) Qy	13, UI
15		(x) Px v (y) Qy	14, vI

SET E PROB Q

1		(x) (y) (Px v Qy) / (x) Px v (y) Qy	
2		(y) (Pa v Qy)	1, UE
3		Pa v Qb	2, UE
4		~ ( (x) Px v (y) Qy)	A
5		~ (x) Px & ~ (y) Qy	4, DM
6		~ (x) Px	5, &E
7		(Ex) ~Px	6, ~U
8		a   ~Pa	A
9		Pa v Qb	3, R
10		Qb	8, 9, vE
11		Qb	7, 8-10, EE
12		(y) Qy	11, UI
13		(x) Px v (y) Qy	12, vI
14		(x) Px v (y) Qy	4, 13, (4-13), RD

SET E PROB Q

1		(Ex) (y) Jxy	P
2		(Ey) (Ez) (Hz y & ~Py)	P
3		(z) (w) ( (Jzw & ~Pw) > Gz) / (Ez) Gz	
4		c   (Ez) (Hz c & ~Pc)	A
5		d   Hdc & ~Pc	A
6		~Pc	5, &E
7		~Pc	4, 5-6, EE

8		(Ex) (y) Jxy	1, R
9	a	(y) Jay	A
10		Jac	9, UE
11		~Pc	7, R
12		Jac & ~Pc	10, 11, &I
13		(z) (w) ( (Jzw & ~Pw) > Gz)	3, R
14		(w) ( (Jaw & ~Pw) > Ga)	13, UE
15		(Jac & ~Pc) > Ga	14, UE
16		Ga	12, 15, >E
17		(Ez) Gz	16, EI
18		(Ez) Gz	8, 9-17, EE
19		(Ez) Gz	2, 4-18, EE

SET E PROB R